

REMARKS

Claims 1, 2 and 7-20 are pending in the present application for further prosecution.

Applicants submit amendments and arguments for overcoming the rejections based on the prior art of record. No new matter was added. Accordingly, Applicants respectfully submit that claims 1, 2 and 7-20 are in condition for allowance.

I. Claim Rejection - 35 USC §103(a)

- A. *In the FINAL Office Action dated November 12, 2009, claims 1, 2 and 7-14 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 03-079734 A of Fukuda and in further view of U.S. Patent No. 6,579,431 B1 issued to Bolcavage et al.*

In the FINAL Office Action, it is stated that Zhang et al. discloses all claim limitations with the exception of the specific weight percentages of Si, Ni and Cr. JP ‘734 is relied upon for weight percentages of Si and Cr, and Bolcavage et al. is relied upon for a weight percentage of Ni.

In the FINAL Office Action, the Examiner states that “the claims do not require the sputtering target to be directly bonded to the backing plate.” It is noted that independent claim 17 of the present application specifically requires the target to be “bonded directly to a copper alloy backing plate”. It is also noted that claim 17 is not rejected based on the above cited combination of references. Accordingly, Applicants believe that the “bonded directly” limitation is the reason that claim 17 has been determined patentable over the above cited combination of references.

As discussed in detail in Applicants’ previous response, Zhang et al. require an assembly including: (i) a pure copper sputtering target; (ii) a copper alloy backing plate; and (iii) a separate nickel alloy interlayer. The nickel alloy interlayer is sandwiched between the target

and backing plate and joins the target to the backing plate. By way of example, see FIG. 1 of Zhang et al. which shows a target (12), separate interlayer (20), and backing plate (16) as a three layer assembly (10).

On column 1, line 66, to column 2, line 8, Zhang et al. teach to one of ordinary skill in the art that the target should not be directly solder bonded to the backing plate; and on column 2, lines 9-21, Zhang et al. teach to one of ordinary skill in the art that the target should not be directly diffusion bonded to the backing plate. Rather, Zhang et al. clearly provides the following teaching to one of ordinary skill in the art (see column 2, lines 22-24):

“To eliminate this intermetallic phase and improve bond strength, it is necessary to use an interlayer, such as Ni or Ti, between the target and the backing plate.”

Accordingly, the sole purpose of the interlayer of Zhang et al. is to “bond” the target to the backing plate and Zhang et al. clearly teach that the target should not be directly bonded to the backing plate (i.e., it is necessary to use an interlayer”).

Accordingly, independent claim 1 of the present application has been amended to require the claimed assembly to comprise a “copper or copper alloy target having a back face and a copper alloy backing plate bonded directly to said back face”. No new matter was added. For example, see page 1, lines 25-29, of the present application, as filed, with respect to the target having a “back face” and with respect to the backing plate being “bonded to the back face”. Also, see: page 6, lines 19-22; page 7, line 4; and page 11, lines 1-4 after Table 3, of the present application, as filed, for additional disclosures of the target being diffusion bonded directly to the backing plate.

For at least this reason, which is believed to be the same reason that claim 17 has been determined patentable over the above cited combination of references, Applicants respectfully request reconsideration and removal of the rejection of claims 1, 2 and 7-14

as being obvious over Zhang et al. in view of JP ‘734 and in further view of the Bolcavage et al. patent.

Applicants also provide the following additional reasons for the patentability of claims 1, 2 and 7-14 over Zhang et al. in view of JP ‘734 and in further view of the Bolcavage et al. patent.

In the FINAL Office Action, it is asserted that the required intermediate layer of Zhang et al. is bonded to the backing plate and that the intermediate layer is included in the backing plate. Nevertheless, just because the intermediate layer is diffusion-bonded to the backing plate, **it does not mean that the components (Ni, Si, etc.) composing the intermediate layer will be diffused across the entire backing plate** (as with the “alloy” of the backing plate inherently required by claim 1 of the present application). In other words, a significant amount of the foregoing components of Zhang et al. only exist in the vicinity of the boundary where the intermediate layer is bonded to the backing plate, and there will be variance in the content of the components in the depth direction of the backing plate. Meanwhile, with the present invention, the elements (Ni, Si, etc.) of the claimed “alloy” inherently exist uniformly across the entire backing plate. Accordingly, Applicants respectfully submit that it would be erroneous to interpret that the two layer laminate including both the backing plate and intermediate layer of Zhang et al. discloses the single layer alloy backing plate required by claim 1 of the present application.

For purposes of explanation, assemblies where Ni and Si “exist in a significant amount at the boundary of the backing plate and intermediate layer as in Zhang et al.” and assemblies where Ni and Si “exist uniformly across the entire backing plate as in the present invention” will have the following differences. Specifically, in the present invention, since Ni and Si are distributed uniformly in the backing plate made of the Cu alloy and heat treatment is performed

during the production process of the backing plate, the added components will diffuse and solidify. Thus, the added components will not additionally diffuse or move due to the thermal energy that is applied during a sputtering process. Meanwhile, the assemblies according to Zhang et al. in which Ni and Si are contained in the intermediate layer, Ni and Si will react with the target material and diffuse due to heat generated during a sputtering process. This will cause the backing plate to be subject to physical change, and the backing plate will become warped or deformed during its use. Accordingly, the backing plate of the present invention has a different structure than that of the backing plate/intermediate layer laminate of Zhang et al. and provides significant non-obvious and “unexpected” advantages over the assembly required by the Zhang et al. patent.

Further, with respect to the combination of JP ‘734 with Zhang et al., it is asserted in the FINAL Office Action that, since JP ‘734 teaches a copper alloy backing plate containing 0.05-0.8% of Cr and 0.01-0.3% of Si, it would be obvious to use an alloy having the components disclosed in JP ‘734 in the nickel alloy intermediate layer of the Zhang et al. assembly. Nevertheless, whereas Si is contained in the nickel alloy in Zhang et al., the Si is contained in the copper alloy in JP ‘734, and the physical effect of the content thereof is clearly different with respect to a nickel alloy and with respect to a copper alloy. Accordingly, Applicants respectfully submit that it would not be obvious to one of ordinary skill in the art to treat the Si content in the nickel alloy of Zhang et al. and the Si content in the copper alloy of JP ‘734 as being equivalent. Thus, Applicants respectfully submit that there is no common sense ground for making the respective contents of Si or Cr to be the same amount in Zhang et al. as in JP ‘734.

Still further, with respect to the combination of Bolcavage et al. with Zhang et al., it is asserted in the FINAL Office Action that Bolcavage et al. teaches a Ni content of 1% since the nickel alloy that is used in its intermediate layer could be an alloy containing 1

% of Ni with a remainder being Al or Cr. Nevertheless, the name of the element used to identify an alloy, which is the primary component among alloy components, is generally used and understood by one of ordinary skill in the art to refer to the alloy. For example, an alloy is referred to as “[primary component element] alloy”. It is obvious to one of ordinary skill in the art that the primary component of a “nickel alloy” is Ni, and that the remainder is other alloy elements. Thus, Applicants respectfully submit that it is erroneous to interpret the expression “Ni alloys of Ni 1% Al or Ni 1% Cr” of Bolcavage et al. to mean “containing 1 % Ni and the remainder being aluminum alloy.” Applicants renew their previous request for reconsideration of this point. Applicants respectfully submit that the Ni alloys taught by Bolcavage et al. to one of ordinary skill in the art are 1% Al with the remainder (99%) being Ni and 1% of Cr with the remainder (99%) being Ni.

Bolcavage et al. is further being interpreted such that Cu is contained in an aluminum alloy backing plate. Nevertheless, even assuming that Cu is contained in the aluminum alloy backing plate of Bolcavage et al., it would be erroneous to refer to an “aluminum alloy” containing a small amount of Cu as a “copper alloy” when it is clearly referred to as an aluminum alloy with aluminum being the primary component of the alloy. In addition, Bolcavage et al. only disclose an aluminum alloy backing plate to which a nickel alloy (containing 1% of Al) intermediate layer is diffusion-bonded, and does not disclose a copper alloy backing plate containing 1 % of Ni. Accordingly, Applicants respectfully submit that combining the common sense teachings of Bolcavage et al. with Zhang et al. fails to overcome the deficiencies of Zhang et al. relative to claim 1 of the present application.

Finally, as stated above, Zhang et al. clearly states that it is “necessary to use an interlayer” between the target and the backing plate. Bolcavage et al. provides a similar

disclosure. "Teaching away" is the antithesis of the art suggesting that the person of ordinary skill in the art go in the claimed direction. Essentially, "teaching away" is a per se demonstration of lack of obviousness. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

The assembly of the present application includes a backing plate made of specified alloy bonded directly to the target without an interlayer therebetween. For at least this reason, Applicants respectfully submit that claims 1, 2 and 7-14 are non-obvious over Zhang et al. in view of JP '734 and further in view of the Bolcavage et al. patent.

For all of the above stated reasons, Applicants respectfully request reconsideration and removal of the rejection.

B. *In the FINAL Office Action dated November 12, 2009, claims 17 and 20 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 07-268617 A of Morita.*

In the FINAL Office Action, it is stated that Zhang et al. discloses all claim limitations of claim 17 with the exception of the specific weight percentages of Ni and Si. Thus, JP '617 is relied upon for weight percentages of Ni and Si. Thus, in the FINAL Office Action, it is asserted that JP '617 teaches an Al-M (M: Mg, Cr, Ni, Cu) alloy backing plate to which 0.02-1.0% of Si and 2-40% of Ni are added, and, therefore, it would be obvious to use the composition values disclosed in JP '617 for the Ni and Si content of the backing plate/intermediate layer of the Zhang et al. assembly.

Nevertheless, JP '617 is directed to an aluminum alloy backing plate having aluminum as its primary component. The Ni and Si content in the aluminum alloy of JP '617 and the Ni and Si content in the nickel alloy intermediate layer of Zhang et al. cannot be viewed by one of ordinary

skill in the art as being the same, nor are there any grounds for causing the contents thereof to be the same amount.

The U.S. Supreme Court in KSR International v. Teleflex Inc., 127 S.Ct. 1727, 82 USPQ2d 1385, has made it clear that “rejections on obviousness grounds cannot be sustained by mere conclusory statements”; rather, there must be “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”. Applicants respectfully submit that, when the standards required by the U.S. Supreme Court in KSR to reach the legal conclusion of obviousness are properly applied to claims 17 and 20 of the present application, one of ordinary skill in the art using common sense would clearly not find the subject matter recited by the claims of the present application to be obvious based on a combination of Zhang et al. in view of the entirely different alloy disclosed by JP ‘617.

Further, Zhang et al. clearly states that it is “necessary to use an interlayer” between the target and the backing plate. On column 1, line 66, to column 2, line 8, Zhang et al. teach to one of ordinary skill in the art that the target should not be directly solder bonded to the backing plate, and on column 2, lines 9-21, Zhang et al. teach to one of ordinary skill in the art that the target should not be directly diffusion bonded to the backing plate. “Teaching away” is the antithesis of the art suggesting that the person of ordinary skill in the art go in the claimed direction. Essentially, “teaching away” is a per se demonstration of lack of obviousness. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

The assembly of the present application includes a backing plate made of specified alloy bonded directly to the target without an interlayer therebetween. The intermediate layer laminated to the backing plate of Zhang et al. cannot fairly be

interpreted as an “alloy” as required by claim 17 of the present application. An “alloy” is known to one of ordinary skill in the art as a uniform mixture of metals; typically the metals are uniformly mixed together in a molten state. The mere fact that the separate Ni-alloy “interlayer” of Zhang et al. is bonded to a surface of a backing plate does not make the backing plate of Zhang et al. an “alloy” including Ni. Any Ni which diffuses into the backing plate will be located close to the surface of the backing plate and will not be uniformly distributed throughout the thickness of the backing plate as would be required of an alloy. Accordingly, the combination of the Ni alloy “interlayer” bonded to the backing plate does not make the combination an “alloy”.

For at least these reasons, Applicants respectfully submit that claims 17 and 20 are non-obvious over Zhang et al. in view of JP ‘617.

C. *In the FINAL Office Action dated November 12, 2009, claims 15 and 16 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 01-180975 A of Ishikura.*

In the FINAL Office Action, it is stated that Zhang et al. disclose all claim limitations of claim 15 with the exception of the inclusion of Be. JP ‘975 is relied upon for this purpose by the Examiner. Accordingly, the Examiner is asserting that JP ‘975 teaches a Cu backing plate having a purity level of at least 99.7% and 100-3000wtppm of Be added thereto. Applicants respectfully disagree and respectfully request reconsideration with respect to at least the disclosure provided by JP ‘975.

JP ‘975 clearly fails to disclose the addition of Be to a copper alloy. JP ‘975 relates to a Cu backing plate having a purity level of 99.7% or higher to which is added, in a total amount of 100-3000wtppm, at least one or more types selected from Cd, Fe, Co, Ni, Ti, W, V, Si, Zr, Bi, Ga, Ge, Pt, Pd, Rh, Ru, Ir, Os, Au, and Ag. There is no disclosure of adding Be. Accordingly,

Applicants respectfully submit that JP ‘975 has been misread by the Examiner and is being misapplied in the FINAL Office Action.

For at least this reason, Applicants respectfully submit that claims 15 and 16 are non-obvious over Zhang et al. in view of JP ‘975.

- D. *In the FINAL Office Action dated November 12, 2009, claims 18 and 19 are rejected under 35 USC §103(a) as being obvious over U.S. Patent No. 6,619,537 B1 issued to Zhang et al. in view of JP 07-268617 A of Morita and further in view of JP 03-079734 A of Fukuda.*

Claims 18 and 19 depend from claim 17. Applicants respectfully submit that claims 18 and 19 are patentable over Zhang et al. in view of JP ‘617 and further in view of JP ‘734 for the same reasons stated above with respect to independent claim 17 being patentable over Zhang et al. in view of JP ‘617.

Accordingly, Applicant respectfully requests reconsideration and removal of the above referenced rejection of claims 18 and 19.

II. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the claim rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

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Respectfully submitted,
Howson & Howson LLP
Attorneys for Applicants

By /William Bak/
William Bak
Reg. No. 37,277
501 Office Center Drive
Suite 210
Fort Washington, PA 19034
(215) 540-9216